# THE EFFECT OF FOREIGN DIRECT INVESTMENT ON DOMESTIC INVESTMENT IN NIGERIA: ANY ROLE FOR FINANCIAL DEVELOPMENT AND HUMAN CAPITAL?

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***ABSTRACT***

*The paper employs the DOLS estimation technique to investigate the effect of FDI on domestic investment in Nigeria. The effects of interactions between FDI and financial system development and, FDI and secondary school enrolment (proxy for human capital) are also investigated. The empirical evidence indicates that the effect of FDI on domestic investment is positive, but not statistically significant. It however finds that when interacted with financial system development, FDI positively and significantly affects domestic investment. The study also finds that the effect of interaction between FDI and secondary school enrolment on domestic investment is negative. This is indicative of existence of a threshold level of human capital development required for FDI to positively affect domestic investment. Further evidence from the study are that low rate of inflation is favourable to domestic investment whereas high rate of inflation adversely affects domestic investment. Trade openness is also observed to negatively affect domestic investment in the country. Policy recommendations emanating from the study include proper regulation of the financial system to enhance its development, efforts by the government to improve the quality and functionality of secondary education in the country, targeting low inflation rate and infant industry protection.*

***Keywords****: Foreign Direct Investment, Financial System Development, Human Capital, Inflation, Trade Openness, Domestic Investment, DOLS.*

***JEL Classification Codes****: E22, E24, E31, E44, F21, F43, I26, P33, P45.*

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## 1. INTRODUCTION

Where there is a dearth of domestic savings required to meet the investment need of an economy, foreign investment becomes desirable to fill the domestic savings-investment gap (Nwanna, 1986; Akande and Oluyomi, 2010). This is a focus of the dual-gap theory, which is an extension of the Harrod-Domar model. The inflow of foreign direct investment to an economy is expected to raise the level of investment therein, enhancing its growth (Aigheyisi, 2016).

There has been much debate on the effect of FDI on domestic investment, but the empirical evidence on the relationship between both variables has been inconclusive. While several studies show that FDI actually complements or crowd-in domestic investment (Agosin and Meyer, 2000; Desai, Foley and Hines, 2007) others indicate that FDI substitutes or crowd-out domestic investment (Eregha, 2011; Acar, Eris and Tekce, 2012).

It has been argued that the effect of FDI on key macroeconomic variables (growth, domestic investment etc) depends on a country's absorptive capacity measured in terms of the level of development of its human capital, financial system etc (Fu, 2008; Nguyen, et al, 2009). This is hardly contentious considering that one of the benefits of FDI is that it is a means of technology transfer. The ability of an economy to absorb the benefits therefore is a determinant of its effect on the level of domestic investment in the economy. The effect could be adverse in countries with weak absorptive capacities such as the LDCs. It could be positive where absorptive capacities are strong as in developed countries and fast growing emerging markets economies.

Our search of the literature finds that for Nigerian economy, the literature is replete with studies investigating the effect of FDI and domestic investment on economic growth. Only few have investigated the effect of FDI on domestic investment. The study by Eregha (2011) examines the dynamic linkages between FDI and domestic investment in ECOWAS (that is, within a panel data setting), while the study by Dantama and Usman (2012) employs Granger causality test to analyse the relationship between FDI and domestic investment in Nigeria. Previous studies on other countries and regions have tended to focus only on the effect of FDI on domestic investment without taking into consideration the influence of absorptive capacity (human capital and financial system development) on the effect FDI on domestic investment in the countries and regions. Obvious gaps therefore exist in the literature and this study intends to fill these gaps. The justification of this study lies in its consideration of the role of absorptive capacities in terms of human capital and the level of development of the financial system in the effect of foreign direct investment on domestic investment in a country.

The paper therefore has a two-fold objective, which are: to investigate the long-run effect of FDI on domestic investment in Nigeria, and to examine the influence of human capital and financial development on the effect of FDI on domestic investment in Nigeria.

For ease of analysis and presentation, the paper is divided into six sections. This section (section 1) introduces the study, its objectives and significance, and the gaps in the literature it seeks to cover as well as its contribution to the extant literature. Section 2 presents background information on the trends in FDI and domestic investment, and the sectoral distribution of FDI in the country. Relevant literature is reviewed in Section 3 and the section is concluding with a highlight of the gap in the literature which the paper seeks to cover and its contribution to the literature. The theoretical framework for the study, the model and estimation technique are presented in Section 4 under the methodology. The empirical analysis is presented in Section 5. The paper is concluded in Section 6 which also contains recommendations for policy consideration.

## 2. BACKGROUND INFORMATION: TRENDS IN FDI AND DOMESTIC INVESTMENT; SECTORAL DISTRIBUTION OF FDI)

The trends in net FDI inflow as a percentage of GDP and gross capital formation (domestic investment) as a percentage of GDP in Nigeria are presented in Table 1. Table 2 shows the trends in volumes of net FDI vis-à-vis the volumes of domestic investment between 1981 and 2015. An immediate observation from both figures is that domestic investment consistently dominates foreign investment in the country. Also observable is that in most part of the period, net FDI as percentage of GDP and domestic investment as a percentage of GDP tend to move in opposite direction. Similar relationship is observed for net FDI and domestic investment. This suggests that FDI investment has not been complementary to domestic investment in the country as found by Eregha (2011) in a panel data study of 10 ECOWAS countries including Nigeria. As observed by Ndikumana and Verick (2007), FDI has not had meaningful impact on economic development because of its limited effects on domestic investment and employment.

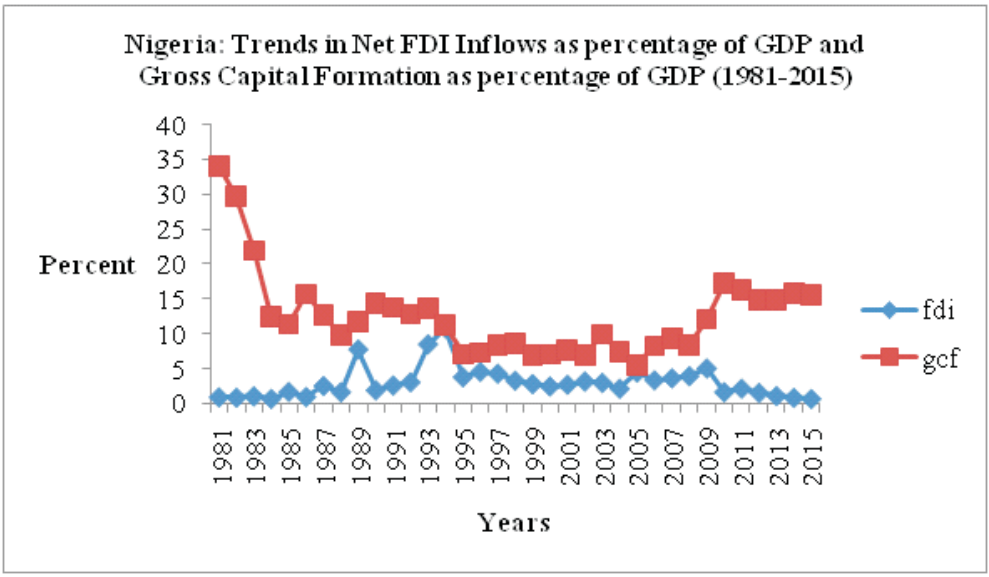


**Figure 1. Nigeria Trends in FDI a percentage of GDP and Gross Capital Formation as Percentage of GDP**
**Source: Data from the World Bank's World Development Indicators (2016)**

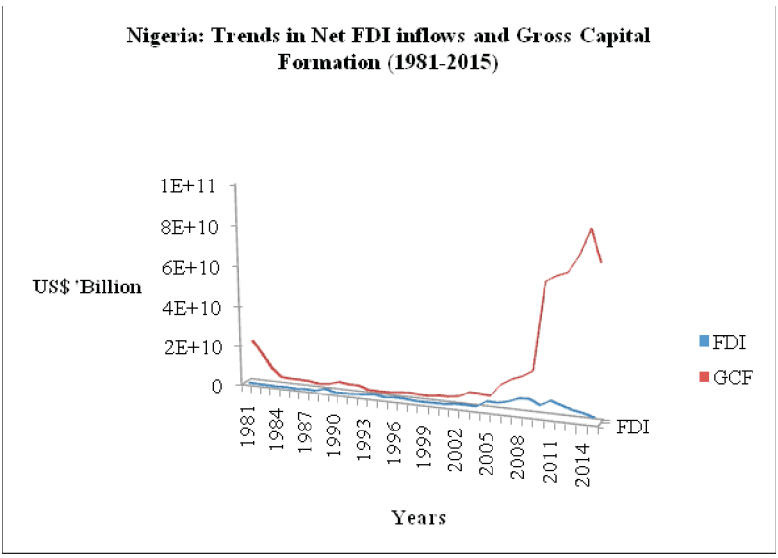


**Figure 2. Nigeria's net FDI inflows and Gross Capital Formation (Domestic Investment)**
**Source: Data from the World Bank's World Development Indicators (2016)**

FDI inflow to the economy tends to be concentrated in the extractive sectors (mining and quarrying, particularly oil and gas) and the manufacturing sector. More recently, the attractiveness of the telecommunication sector to FDI has also improved. However, agriculture, transportation, building and construction have remained quite unattractive to FDI inflow (Table 1).

**Table 1. Sectoral Distribution of FDI in Nigeria (₦ 'Billion)**

| Sector | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| **Agriculture, Hunting, Forestry and Fishing** | **8.00** | **6.09** | **6.78** | **7.30** | **-2.23** |
| **Financing, Insurance, Real Estate & Business Services** | **244.16** | **451.79** | **461.36** | **504.41** | **793.16** |
| *of which:Banking* | 211.99 | 372.42 | 213.04 | 235.01 | 200.38 |
| *Insurance* | 10.62 | 10.23 | 104.07 | 108.27 | 2.96 |
| *Business Services* | 13.69 | 61.54 | 144.25 | 161.13 | 585.64 |
| *Real Estate* | 7.86 | 7.61 | 0.00 | 0.00 | 4.19 |
| **Extractive** | **3,955.43** | **4,853.76** | **5,619.81** | **5,749.53** | **6,027.07** |
| *of which:Oil and Gas* | 3,925.85 | 4,805.68 | 5617.12 | 5746.84 | |
| *Free Trade Zone* | 12.99 | 14.81 | 2.69 | 2.69 | |
| *Nonoil* | 29.57 | 48.08 | - | - | |
| **Construction** | **122.06** | **156.31** | **679.49** | **700.20** | **222.64** |
| *of which: Free Trade Zone* | 85.96 | 120.26 | 417.96 | 417.96 | |
| **Manufacturing** | **1,911.99** | **2,309.87** | **2,557.77** | **3,001.53** | **6,411.31** |
| *of which:Free Trade Zone* | 461.38 | 725.56 | 217.91 | 217.91 | |
| **Transport, Storage and Communication** | **1,264.08** | **1,164.69** | **912.26** | **736.16** | **1,235.83** |
| | 990.26 | 782.50 | 66.67 | 69.01 | 471.70 |
| *of which:Transport* | - | 23.12 | 16.27 | 16.27 | - |
| *Free Trade Zone* | 273.82 | 382.19 | 845.59 | 667.15 | 764.13 |
| *Communication* | | | | | |
| **Wholesale and Retail Trade, Catering and Accommodation** | **603.27** | **572.8** | **1,508.58** | **1,525.21** | **320.59** |
| *of which:Wholesale and Retail* | 601.13 | 570.29 | 1492.00 | 1508.50 | |
| *Catering & Accommodation* | 2.14 | 2.52 | 16.59 | 16.71 | |
| **Global Total** | **8,108.99** | **9,515.34** | **11,746.06** | **12,224.34** | **15,008.36** |

**Source: Central Bank of Nigeria's Annual Survey of Foreign Assets and Liabilities (SOFAL), various years**

**Table 2. Sectoral Shares of FDI in Nigeria**

| Sector | Sectoral Share of FDI (%) | | | | |
|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | 2013 | 2014 |
| Agriculture, Hunting, Forestry and Fishing | 0.10 | 0.06 | 0.06 | 0.06 | -0.01 |
| Financing, Insurance, Real Estate & Business Services | 3.01 | 4.75 | 3.93 | 4.13 | 5.28 |
| Extractive | 48.78 | 51.01 | 47.84 | 47.03 | 40.16 |
| Construction | 1.51 | 1.64 | 5.78 | 5.73 | 1.48 |
| Manufacturing | 23.58 | 24.28 | 21.78 | 24.55 | 42.72 |
| Transport, Storage and Communication | 15.59 | 12.24 | 7.77 | 6.02 | 8.23 |
| Wholesale and Retail Trade, Catering and Accommodation | 7.44 | 6.02 | 12.84 | 12.48 | 2.14 |

**Source: Author's calculations using CBN SOFAL, various years**

The sectoral distribution of FDI presented in Table 1 and the sectoral shares of FDI in Nigeria presented in Table 2 indicate three sectors of the economy namely extractive sector (particularly oil and gas), manufacturing and more recently, telecommunications has been more attractive to foreign direct investment. Between 2010 and 2014, the share of FDI in the extractive sector exceeds those of other sectors of the economy. Next to the extractive sector in the sectoral share of FDI is the manufacturing sector, followed by the transport, storage and communication sector. The extractive sector attracted 48.78%, 51.01%, 47.84%, 47.03% and 40.16% of total FDI that flowed into country in 2010, 2011, 2012, 2013 and 2014 respectively. The manufacturing sector attracted 23.58%, 24.28%, 21.78%, 24.55% and 42.72% of total FDI inflows in 2010, 2011, 2012, 2013 and 2014 respectively. The transport, storage and communication sector attracted 15.59%, 12.24%, 7.77%, 6.02% and 8.23% of total FDI in 2010, 2011, 2012, 2013 and 2014 respectively. These are sectors of the economy perceived by the foreign investors to have potentials for higher returns on investment. The attractiveness of the extractive sector for instance hinges on the favourable demand for Nigeria's crude-oil (which plays key role in the fueling of the global economy) in the global market coupled with the fact that the country is richly endowed with the resource. The attractiveness of the country's manufacturing sector is not unconnected with the fact that Nigeria is a net importer of manufactured goods which she lacks the technology and the human capital (skill) to produce. This implies that the demand for manufactured goods is quite high. It is also not unconnected with the fact that Nigeria is fast becoming a major manufacturing hub in Africa. It can be observed that the share of FDI attracted by the manufacturing sector in 2014 exceeded the shares attracted by other sectors of the economy including the extractive sector.

This could have been partly as a result of the National Automotive Industry Development Plan (NAIDP) of 2013 which sought to discourage importation of vehicles, encourage local production and transform Nigeria into Africa's automotive hub. These policies, according to the National Bureau of Statistics, succeeded in attracting much FDI into the manufacturing sector (Oaikhenan and Aigheyisi, 2015). The attractiveness of transport, storage and communication sector to foreign direct investment could be linked to recent increase in demand for telecommunication services and air and sea travels. The inflow of FDI into the telecommunication and manufacturing sectors encouraged local investors to invest in those sectors. For example, glo mobile which is an indigenous telecommunication service provider came up after entry of foreign telecommunication companies – MTN and Econet (now airtel) – into the Nigerian telecommunications market. Other telecommunications companies such as Visa and Starcomms also sprang up on the platform of Code Division Multiple Access (CDMA) but could not compete with the giant gsm (global satellite for mobile communication) companies which already dominated the market. Innoson Nigeria which is an indigenous automobile assembler came up after Peugeot Nigeria and other foreign automakers entered the manufacturing sector. Several indigenous fruit and food processing firms also sprang up following entry into Nigeria's economy by (subsidiaries of) foreign fruit and food processing companies. In all these, it could be said that though FDI stimulated domestic investment in some sectors of the economy such as manufacturing, it has been unevenly distributed as the shares of FDI in many of the sectors are quite low.

## 3. LITERATURE REVIEW

Empirical investigations on the relationship between foreign direct investment and domestic investment include those of Ghebreyesus and Cadet (1998), Agosin and Meyer (2000), Razin (2004), Desai, et al (2007), Arndt, Buch and Schnitzer (2007), Prasanna (2010), Eregha (2011), Acar, et al (2012), Al khatib, et al (2012), Lautier and Moreaub (2012), Gocer, Merkan and Peker (2014), etc.

Ghebreyesus and Cadet (1998) investigate the impact of FDI inflows on domestic investment in sub-Sahara Africa in the periods between 1980 and 1990 using the ordinary least squares estimation technique, and find that FDI had no significant impact on domestic investment.

Agosin and Meyer (2000) develop a model of investment that explicitly incorporates an FDI variable to assess the extent to which FDI in developing countries in the regions of Africa, Asia and Latin America crowds in or crowds out domestic investment using panel data for the period 1970-1996 and two sub-periods 1976-1985 and 1986-1996. The results indicate that there has been strong crowding in of domestic investment by FDI in Asia, although the crowding in effect of FDI on

domestic investment was less in Africa than in Asia. There is however strong evidence of crowding out of domestic investment by FDI in Latin America.

Razin (2004) also investigates the contribution of FDI flows to domestic investment in capacity and vice versa, in a sample of sixty four countries developing countries including Israel, in the period 1976-1997, using various methodologies (panel OLS, TSLS). The study finds that the effect of FDI on domestic investment in capacity is larger than the effect of loans and foreign portfolio inflows. Further evidence from the study is that Domestic investment has stronger effect on FDI inflows than inflow of loan and foreign portfolio investment.

Goedegebuure (2006) examines the relationship between outward FDI and domestic investment in the Netherlands using longitudinal data set spanning the years 1996-2000. Contrary to popular notion, the study provides strong evidence that (domestic) investments in Research and Development are positively correlated to outward FDI in high tech industries and companies. Further evidence from the study is that capital investments are also positively correlated to outward FDI.

The study by Kottaridi and Stengos (2007) which applies least squares dummy variable (LSDV) estimation technique to tests the hypothesis that FDI requires a threshold of absorptive capacities in terms of human capital (using total mean years of schooling as proxy) in order to positively affect growth in a sample of 25 OECD and 20 non-OECD countries over the period from 1970 to 2004 finds, contrary to predictions, that interaction between FDI and human capital adversely affects economic growth. The study concludes that there exists a threshold level of human capital for FDI to positively affect growth.

Desai, *et al*. (2007) investigates the effect of United States' manufacturing firms' foreign investment (triggered by foreign economic growth) on domestic investment in recipient countries. The investigation shows that US manufacturing firms' foreign capital investment is positively related to domestic investment in the recipient countries, domestic investment rising by 2.2 percent in response to 10 percent rise in U.S. manufacturing firms' investment spurred by foreign economic growth. There is also evidence of positive FDI effect on domestic employee compensation, domestic export and research and development (R&D) spending.

Arndt et al (2007) employs panel cointegration methods to investigate the impact of FDI on domestic investment in Germany using industry level data. The investigation reveals a positive long-run impact of FDI on domestic capital stock and on the stock of inward FDI in the country.

Ndikumana and Verick (2007) employ fixed effect and robust OLS estimators to investigate the linkages between FDI and domestic investment in sub-Sahara Africa. The study finds that FDI crowds in domestic investment in SSA. It also finds that countries in the region would gain more from FDI if their domestic investment climates are improved.

The effect of interaction between FDI and financial development on economic growth of Malaysia in the period from 1970 to 2001 is investigated using a cointegration framework in Choong and Lim (2008). The effects of other variables such as FDI standing alone, labour government expenditure and domestic investment on growth are also examined. The evidence reveals that these other variables play key roles in economic growth, but the effect of FDI-finance interaction on growth is more significant.

Prasana (2010) explores the impact of FDI inflows on domestic investment in India in the 16 year period from 1991-92 to 2006-7 using a lagged version of the UNCTAD (1999) model and finds that the direct effect FDI on domestic investment was significantly positive, while the indirect impact was 'neutral' in the long-run.

Eregha (2011) studies the dynamic linkages between foreign direct investment and domestic investment in ECOWAS countries in the period 1970-2008 using panel cointegration analysis. The analysis reveals that foreign direct investment inflow substitutes domestic investment in the ECOWAS sub-region. In other words FDI crowds out domestic investment in the sub-region. The study further reveals that that export openness and import openness respectively exerted positive and negative effects on domestic investment in the sub-region.

Acar et al (2012) examines the relationship between FDI and domestic investment in thirteen selected countries in the Middle East and North Africa (MENA) region in the period 1980-2008 using the dynamic panel Generalized Method of Moments (GMM) estimator. The model is estimated for all selected MENA countries, the oil-rich MENA countries and oil-poor MENA countries. The empirical evidence shows that for all selected MENA countries, and the oil-rich and the oil-poor MENA countries, FDI has significant negative effect on domestic investment.

Al khatib et al (2012) employ the method of cointegration and error correction in an empirical investigation of the determinant of domestic investment in Jordan in the period 1980-2005. The analysis indicates find foreign direct investment has significant positive long-run and short-run effects on domestic investment in the country.

The relationship between FDI and domestic investment in Nigeria over the period from 1981 to 2010 is investigated in Dantama and Usman (2012) using Granger causality analysis. The study finds no causal relationship between FDI and domestic investment. The researchers conclude that FDI tends to discourage domestic investment in the country.

Huang *et al*. (2013) examine the role of financial development and FDI and their interaction in capital allocation in China using system GMM for analysis of Chinese industrial and regional data. The study finds that financial development and FDI individually improve the efficiency of capital allocation, but tend to substitute or crowd out each other's effect. In particular, the study finds a threshold value for financial development above which increase in FDI adversely affects the efficiency of capital allocation. It also finds a threshold value for FDI above which further development of the financial system adversely affects the effficency of capital allocation rather than improve it.

Farla, Crombrugghe and Verspagen (2013) employ a modified system GMM estimator to investigate the relationship between FDI and domestic investment levels using balanced 12 years panel data on 46 countries. The analysis finds evidence that FDI crowds in domestic investment. The analysis further finds evidence of a weak positive relationship between good governance and higher investment levels.

Al-Sadig (2013) investigates the effect of FDI outflows on domestic investment in a sample of 121 developing and transition economies over the period 1990 to 2010 using cross sectional regression (system GMM estimator). The analysis indicates amongst others, that FDI outflow had significant negative effect on domestic investment. A 1% increase in the outflow of FDI was associated with 0.97% decrease in domestic investment. The significant negative effect remained unchanged after controlling for other explanatory variables.

Omri and Kahouli (2014) examined the nexus among foreign investment, domestic capital and economic growth in the Middle East and Northern Africa (MENA) region in the period from 1990 to 2010 within a framework of simultaneous equations estimated using the GMM technique. The study finds two-way relationship between FDI and economic growth, and domestic investment and economic growth. However, a unidirectional causality is found between FDI and domestic investment, with causality running from FDI to domestic investment for the entire region. Specifically, FDI positively and significantly impacts domestic investment.

Gocer et al (2014) also investigate the effect of FDI on the domestic investment of developing countries using panel data on 30 developing countries in the regions of

Asia, Latin America, the Caribbean and Africa, covering the period 1992-2010. The analysis indicates that FDI crowds in domestic investment in Asia, Latin America and Caribbean countries, and crowds out domestic investment in the developing countries of Africa.

The study by Esfandyari (2015) finds that the positive effect of FDI on growth is dependent on the financial development. Using cross section data covering the period from 2004 to 2013 on D8 countries, the study finds no significant effect of FDI on economic growth, but the interaction between FDI and a threshold level of financial development equal to 3.39 positively and significantly affect growth. The study recommends strengthening of the financial markets as a prior condition for attracting FDI.

Ipek and Kizilgol (2015) investigate the contribution of FDI to domestic investment in Turkey, Mexico, Russia, Brazil and South Africa in the period from 1990:1 to 2012:3 for Turkey and Mexico; 1995:1 to 2012:2 for Russia; 1995:1 to 2012:3 for Brazil; and 1990:1 and 2011:4 for South Africa using the methodology of generalized method of moments (GMM). The aim of the study is to determine whether FDI complements (or crowd in) domestic investment or substitutes (or crowd out) domestic investment or has no effect on domestic investment in the countries. The study finds that FDI crowds out domestic investment in Turkey and South Africa, but crowds in domestic investment in Russia. It also finds no significant effect of FDI on domestic investment in Brazil and Mexico.

Waliu (2017) investigates the individual effects of FDI and financial development on economic growth and the effect of interaction between these variables on economic growth in Nigeria in the period from 1982 to 2014 using Granger causality and least squares analysis. The study finds negative individual effects of FDI and financial development on economic growth, but positive and significant effect of interaction between FDI and financial development on economic growth, suggesting that the effect of FDI on economic growth in Nigeria is dependent on the level of development of the financial system.

From the review of the literature, it can be observed that previous studies focused on effect of FDI and financial development on economic growth; the effect of interaction between FDI and financial development on economic growth; the effect of FDI on domestic investment. However, to the best of our knowledge, studies on the effect of FDI on domestic investment in Nigeria are sparse. This study intends to contribute the literature in this regard. It differs from the previous study by the methodology it adopts, which is the dynamic OLS estimation technique for cointegrating model which controls for regressor endogeneity and serial correlation. Furthermore, none of

the previous studies considered whether or not absorptive capacities (human capital and the state of the financial system) have any bearing on the effect of FDI on domestic investment, considering that these could affect the effect of FDI on domestic investment (Nowbutsing, 2009). In other words, the effects of interaction between FDI and financial development and the interaction between FDI and human capital on domestic investment have not yet been investigated. This study intends to fill these obvious gaps, and achieving this would mark its novelty.

## 2. THEORETICAL FOUNDATION AND MODEL

### 2.1. Theoretical Foundation

According to Agosin and Mayer (2000), total investment in an economy at any point in time comprises domestic capital formation and foreign capital inflow.

$$I_t = I_{d,t} + I_{f,t} \qquad 1$$

Where $I_t$ = total investment, $I_{d,t}$ = domestic investment (investment by domestic firms) and $I_{f,t}$ = foreign direct investment (and other forms of foreign investment) inflows.
The development impact of FDI (or $I_{f,t}$) depends on its effect on $I_{d,t}$. If it has no effect on $I_{d,t}$, increase in $I_{f,t}$ will engender increase in total investment $I_t$ in the economy. If there is a crowding in effect which is likely to occur where there are no existing domestic producers owing to non-availability of technological requirements or lack of knowledge of foreign markets, and FDI inflow engenders introduction of new products and services in the economy either for the domestic market or for exports, the increase in FDI will engender a more than proportionate increase in $I_t$. If FDI inflows results in crowding out (or substitution) of domestic investment which is likely to transpire where there already exists domestic producers, as a result of their being exposed to foreign competition, the contribution to total investment by such FDI will be less than the FDI inflow. In other words, total investment may increase, but the increase would be less than the increase in FDI. In all these, the effect of FDI on domestic investment may vary from country to country and depends on domestic policy, the kind of FDI flowing into a country, strength of domestic enterprises and absorptive capacities such as skill or the level of development of human capital, financial system development etc.

The contribution of FDI to economic development through its (crowding-in effect) on domestic investment is presented in Romer (1993) using an endogenous growth model wherein FDI is considered a major agent for introduction of new goods as well as the technology and human capital which accompany such goods into an economy which hitherto was lacking the know-how and human resources required for their production.

The theoretical framework developed by Nowbutsing (2009) shows that FDI affects economic growth directly as depicted in the Neoclassical production function following the Solow's tradition in which output is expressed as a function of technology, capital and labour, and indirectly – through its effect on domestic investment. The effect of FDI on domestic investment is however dependent on the country's absorptive capacities.

### 4.2. The Model and Justification of Included Variables

We specify a model consistent with the theoretical foundation and the literature to investigate the effect of FDI and its interaction with human capital and financial system development on domestic investment in Nigeria in its functional form as:

$$gcfy = F(fdi, fdi*hc, fdi*fd, inf, inf^2, ddbt, topen) \quad [1]$$

Where:

gcfy = gross capital formation as percentage of GDP;

fdi = net foreign direct investment inflows as percentage of GDP;

hc = human capital (proxied by secondary school gross enrolment rate). This is included as a measure of absorptive capacity. This paper adopts secondary school enrolment because it enhances knowledge spill over through FDI inflows;

fd = financial system development, measured as broad money (m2) as a percentage of GDP, also included as absorptive capacity;

inf = inflation, measured as annual percentage change in consumers' price index; exrt = Nominal Naira/Dollar exchange rate.

ddbt = domestic debt as a percentage of GDP;

topen = total trade (export plus import) as a percentage of GDP.

Fdi, fdi*hc, and fdi*fd are the explanatory variables of interest.

Inflation, domestic debt as a percentage of GDP and trade openness variables are included in the model as control variables.

According to Nwanna (1986), the final impact of FDI on domestic capital formation cannot be determined *a priori* as this depends on the domestic absorptive capacity of the economy of the host (recipient) country. The efficiency of the banking system (the extent of development of the nation's financial system) also enhances the effect of FDI on domestic investment as banking system efficiency enhances the availability of foreign funds to local firms (Nwanna, 1986).

Education (especially secondary school enrolment) and life expectancy at birth at frequently used as proxies for human capital in empirical studies (Baum and Lake, 2003). This study opts for secondary school enrolment as education plays critical role in development of human capital and imbues it with the skill to absorb the technology and skills spillover of FDI. The *a priori* expectation with respect to the effect of interaction of FDI with human capital on domestic investment is that the interaction term will be positively related to domestic investment as human capital absorbs the skill being transferred into the home economy through FDI inflows.

High rates of inflation could adversely affect domestic investment as increase in prices of input used for production could be a disincentive for investment. However, considerable level of inflation could positively affect domestic investment. Deflation also could adversely affect investment. Thus, this study hypothesises existence of a threshold inflation rate beyond which inflation adversely affects domestic investment, thus the inclusion of the squared inflation term as an explanatory variable in the model.

Higher government borrowing from the domestic financial system could crowd out domestic private investment as it drives up interest rate. This transpires where domestic firms rely heavily on funds from the banking system. However, where there is less reliance on the banking system for investible funds, the effect of government domestic debt on domestic investment may not be significant.

Less restriction on cross border trade (brought about by implementation of favourable trade policies by the government) is hypothesized in this study to positively affect domestic investment, as resident investors are encouraged to release and direct resources towards production of goods in the tradable sectors of the economy as the market for their goods and services are expanded as they gain entrance to foreign markets. This however, also depends on the trade policy of the foreign market.

### 4.3. Empirical Model and Estimation Methodology

The estimation methodology adopted for this study is the Stock-Watson Dynamic Ordinary Least Squares estimation technique proposed by Stock and Watson (1993). This estimation technique improves on the ordinary least squares (OLS) estimator by coping with small sample and dynamic sources of bias. It is a robust single equation approach which corrects for regressor endogeneity peculiar with cointegrated regressors by inclusion of leads and lags of first differences of the regressors. It also corrects for serially correlated errors (residuals) by generalized least square (GLS) procedure to provide optimal estimates of cointegrating regressions (Al-Azzam and Hawdon, 1999).

The cointegrating (DOLS) model for our investigation is specified as:

$$\ln(gcfy_t) = \beta_0 + \beta_1 \ln(fdi_t) + \beta_2\left(\ln(fdi_t) * \ln(fd_t)\right) + \beta_3\left(\ln(fdi_t) * \ln(hc_t)\right) + \beta_4(inf_t) + \beta_5(inf2_t) + \beta_6 \ln(ddbt_t) + \beta_7 \ln(topen_t) + \sum_{j=-k}^{p}\left(\theta_1 \Delta \ln(fdi)_{t-j}\right) + \sum_{j=-k}^{p}\left(\theta_2 \Delta(\ln(fdi) * \ln(fd))_{t-j}\right) + \sum_{j=-k}^{p}\left(\theta_3 \Delta(\ln(fdi) * \ln(hc))_{t-j}\right) + \sum_{j=-k}^{p}\left(\theta_4 \Delta(inf)_{t-j}\right) + \sum_{j=-k}^{p}\left(\theta_5 \Delta(inf2)_{t-j}\right) + \sum_{j=-k}^{p}\left(\theta_6 \Delta(ddbt)_{t-j}\right) + \sum_{j=-k}^{p}\left(\theta_7 \Delta(topen)_{t-j}\right) + \mu_t \quad [2]$$

The variables are as previously defined; the $\beta_i$s are long-run cumulative multipliers or long-run effects of changes in the explanatory variables on the dependent variable; the $\theta_i$s capture the short run or dynamic effects of changes in the explanatory variables on the dependent variables; p and k represents lag length and lead length respectively, of each explanatory variable. $\mu$ is the error term assumed to be normally distributed with zero mean and constant variance; $\Delta$ is the first difference operator.

The times series properties of the variables shall be examined using the unit root test to identify their order of integration. For this study we employed the Augmented Dickey Fuller (ADF) and the Dickey Fuller Generalised Least Squares tests (DF-GLS). This shall be followed by the cointegration test to ascertain whether or not long-run relationships exist among the variables. The Johansen procedure shall be employed for the cointegration test.

Data used for the estimation are annual time series data for the period 1981 to 2014. They were sourced from the World Bank's World Development Indicators of 2015 and the Central Bank of Nigeria Statistical Bulletin of 2015. Specifically, data on federal government domestic debt were obtained from the CBN Statistical Bulletin, while data on other variables were obtained from the World Bank's WDI. All estimations are performed with the aid of EVIEWS 9.5 computer package.

## 1. Model Estimation Results and Analysis

### 1.1. Descriptive Statistics of Key Variables

We begin the analysis with the descriptive statistics of key variables (gross capital formation as percentage of GDP and FDI as percentage of GDP) and some other variables of the specified model. These are presented in Table 3.

**Table 3. Descriptive Statistics of Key Variables**

| | GCFY | FDI | INF | TOPEN | FD |
|---|---|---|---|---|---|
| Mean | 12.58818 | 3.008268 | 19.71465 | 51.11642 | 24.17955 |
| Median | 11.74670 | 2.600578 | 12.21701 | 53.03022 | 21.82599 |
| Maximum | 34.02084 | 10.83256 | 72.83550 | 81.81285 | 43.26613 |
| Minimum | 5.467015 | 0.650345 | 5.382224 | 21.12435 | 13.23075 |
| Std. Dev. | 6.122224 | 2.268332 | 17.93583 | 16.60285 | 6.656061 |
| Skewness | 1.837585 | 1.738146 | 1.626154 | -0.231411 | 0.826757 |
| Kurtosis | 6.809332 | 6.188644 | 4.372112 | 2.078544 | 3.424549 |
| | | | | | |
| Jarque-Bera | 40.85941 | 32.45091 | 18.17112 | 1.550626 | 4.250092 |
| Probability | 0.000000 | 0.000000 | 0.000113 | 0.460560 | 0.119427 |
| | | | | | |
| Sum | 440.5864 | 105.2894 | 690.0129 | 1789.075 | 846.2842 |
| Sum Sq. Dev. | 1274.375 | 174.9411 | 10937.60 | 9372.257 | 1506.307 |
| | | | | | |
| Observations | 35 | 35 | 35 | 35 | 35 |

Gross capital formation as percentage of GDP averaged 12.59% in the period under review, and ranged between 5.46% in 2005 and 34.02% in 1981 with median value of 11.74% and standard deviation of 6.12. In same period, foreign direct investment as percentage of GDP averaged 3.01% and ranged between 0.65% 2015 and 10.83% in 1994 with median value of 2.60% and standard deviation of 2.26. These clearly indicate that domestic investment largely dominates foreign direct investment in the economy.

Average inflation in the economy in the period under consideration was 19.71. This was quite high and was way above the threshold inflation rate obtained by previous empirical studies on inflation-growth relationship beyond which inflation adversely affects growth (Bassey and Onwioduokit, 2011; Bawa and Ismaila, 2012). This could have had adverse effect on domestic investment in the economy. Minimum inflation in the period under review was 5.38% (in 2007), but maximum inflation was 72.83% (in 1995). Gross capital formation as percentage of GDP in 1995 was quite low at 7.05% and this could have resulted from the high rate of inflation which prevailed same year. Median inflation and standard deviation were 12.21% and 17.93 respectively.

Nigeria's economy has been well integrated with the global market as indicated by the degree of trade openness, which averaged 51.11% between 1981 and 2015. The degree of trade openness was highest in 2001 when trade between the country and the rest of the world intensified, leaving the contribution of trade to GDP at 81.81%. Money supply as percentage of GDP averaged 24.18% with a median value of 21.83%, and ranged between 13.23% and 43.26% in the period under review.

### 5.2. Unit Root and Cointegration Test Results

The summary of the results unit root tests for the variables (at first differences) are presented in Table 4.

**Table 4. Unit Root Tests for Variables**

| Variable | ADF Test for Unit Root | | | DF-GLS Test for Unit Root | | |
|---|---|---|---|---|---|---|
| | ADF test statistic | Test Critical Value (5%) | I(d) | DF-GLS test statistic | Test Critical Value (5%) | I(d) |
| ln(gcfy) | -6.7082 | -3.5629 | 1 | -6.9501 | -3.1900 | 1 |
| ln(fdi) | -10.3662 | -3.5578 | 1 | -10.5908 | -3.1900 | 1 |
| ln(fdi)*ln(fd) | -9.5556 | -3.5578 | 1 | -9.7811 | -3.1900 | 1 |
| ln(fdi)*ln(hc) | -10.2965 | -3.5578 | 1 | -10.5195 | -3.1900 | 1 |
| Inf | -5.2056 | -3.5578 | 1 | -5.2280 | -3.1900 | 1 |
| $Inf^2$ | -5.8768 | -3.5578 | 1 | -6.0358 | -3.1900 | 1 |
| ln(ddbt) | -6.5849 | -3.5578 | 1 | -6.6723 | -3.1900 | 1 |
| ln(topen) | -5.5369 | -3.5950 | 1 | -7.3013 | -3.1900 | 1 |

**I(d) represents order of integration of variable**.

The unit root test results involving the Augmented Dickey Fuller test indicate that the variables are integrated of order 1. We investigate the likelihood of a linear combination of the variables to be integrated of order zero using the Johansen approach to cointegration. In other words, the Johansen test for cointegration is employed to test for existence of long run relationship(s) among the variables. This is necessary because cointegration of the variables is a condition for estimation of the cointegrating (DOLS) regression. The result of the cointegration test is presented in Table 5.

**Table 5. Johansen Cointegration Test Results**

Sample (adjusted):2014 1983
Included observations: 32 after adjustments
Trend assumption: Linear deterministic trend
Series: LOG(GCFY) LOG(FDI) FDIFD FDIHC INF INF2 LOG(DDBT) LOG(TOPEN)
Lag intervals (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

| Hypothesized No. of CE(s) | Eigenvalue | Trace Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None * | 0.892673 | 244.5535 | 159.5297 | 0.0000 |
| At most 1 * | 0.830043 | 173.1335 | 125.6154 | 0.0000 |
| At most 2 * | 0.739714 | 116.4227 | 95.75366 | 0.0009 |
| At most 3 * | 0.578020 | 73.35155 | 69.81889 | 0.0254 |
| At most 4 | 0.482011 | 45.74203 | 47.85613 | 0.0779 |
| At most 5 | 0.403806 | 24.69235 | 29.79707 | 0.1727 |
| At most 6 | 0.161632 | 8.142283 | 15.49471 | 0.4503 |
| At most 7 | 0.075173 | 2.500751 | 3.841466 | 0.1138 |

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

| Hypothesized No. of CE(s) | Eigenvalue | Max-Eigen Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None * | 0.892673 | 71.41996 | 52.36261 | 0.0002 |
| At most 1 * | 0.830043 | 56.71078 | 46.23142 | 0.0028 |
| At most 2 * | 0.739714 | 43.07117 | 40.07757 | 0.0223 |
| At most 3 | 0.578020 | 27.60953 | 33.87687 | 0.2321 |
| At most 4 | 0.482011 | 21.04967 | 27.58434 | 0.2732 |
| At most 5 | 0.403806 | 16.55007 | 21.13162 | 0.1943 |
| At most 6 | 0.161632 | 5.641531 | 14.26460 | 0.6595 |
| At most 7 | 0.075173 | 2.500751 | 3.841466 | 0.1138 |

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

**FDIFD = log(fdi)*log(fd); FDIHC = log(fdi)*log(hc)**

The cointegration test results comprising the Trace and Maximal Eigenvalue tests indicate that the variables are cointegrated. While the trace test indicates four cointegrating equations, the Maximam Eigenvalue test indicates three cointegrating equations. Here, linear deterministic trend is assumed. For confirmation, we assume a quadratic deterministic trend in the variables considering the possibility of non-linear relationship between them. The result of the cointegrationn on this assumption is presented in Table 6.

**Table 6. Johansen Cointegration Test Results (Assuming Quadratic Deterministic Trend)**

Sample (adjusted): 1983 2014
Included observations: 32 after adjustments
Trend assumption: Quadratic deterministic trend
Series: LOG(GCFY) LOG(FDI) FDIFD FDIHC INF INF2 LOG(DDBT) LOG(TOPEN)
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

| Hypothesized No. of CE(s) | Eigenvalue | Trace Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None * | 0.911569 | 273.2393 | 175.1715 | 0.0000 |
| At most 1 * | 0.822340 | 195.6223 | 139.2753 | 0.0000 |
| At most 2 * | 0.785080 | 140.3300 | 107.3466 | 0.0001 |
| At most 3 * | 0.766275 | 91.13034 | 79.34145 | 0.0049 |
| At most 4 | 0.568846 | 44.61488 | 55.24578 | 0.3045 |
| At most 5 | 0.307871 | 17.69363 | 35.01090 | 0.8390 |
| At most 6 | 0.168054 | 5.918196 | 18.39771 | 0.8751 |
| At most 7 | 0.000955 | 0.030581 | 3.841466 | 0.8611 |

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

| Hypothesized No. of CE(s) | Eigenvalue | Max-Eigen Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None * | 0.911569 | 77.61701 | 55.72819 | 0.0001 |
| At most 1 * | 0.822340 | 55.29233 | 49.58633 | 0.0115 |
| At most 2 * | 0.785080 | 49.19964 | 43.41977 | 0.0106 |
| At most 3 * | 0.766275 | 46.51546 | 37.16359 | 0.0032 |
| At most 4 | 0.568846 | 26.92125 | 30.81507 | 0.1392 |
| At most 5 | 0.307871 | 11.77543 | 24.25202 | 0.7829 |
| At most 6 | 0.168054 | 5.887616 | 17.14769 | 0.8273 |
| At most 7 | 0.000955 | 0.030581 | 3.841466 | 0.8611 |

Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

**FDIFD = log(fdi)*log(fd); FDIHC = log(fdi)*log(hc)**

The trace and the maximum eigenvalue test results on the assumption of quadratic deterministic trend, both indicate 4 cointegrating equations, thus confirming the result of the trace test where linear deterministic trend was assumed. Indication of cointegrating equations points to existence of long run relationships among the variables.

Existence of several cointegrating equation points to the possibility of endogeneity of the regressors. Estmating the long-run relationship therefore requires the use of a methodology that accounts for regressor endogenity. This necessitates the application of the dynamic ordinary least squares (DOLS) estimation technique.

### 5.3. Estimated DOLS Model

The result of estimation of the specified DOLS model (that is, long-run component of the model) is presented in Table 7.

**Table 7. Dynamic OLS Estimation Result**

| Dependent variable: ln(gcfy) | | | |
|---|---|---|---|
| Sample (adjusted): 1983 2013 | | | |
| Included observations: 31 after adjustments | | | |
| Cointegrating equation deterministics: C | | | |
| Fixed leads and lags specification (lead = 1, lag = 1) | | | |
| Long-run variance estimate (Bartlett Kernel, Newey-West fixed bandwidth = 4.0000 | | | |
| Variable | Coefficient | t-Stat. | Prob |
| ln(fdi) | 8.9333 | 2.6599 | 0.1170 |
| ln(fdi)*ln(fd) | 1.1416 | 5.7101 | 0.0293 |
| ln(fdi)*ln(hc) | -2.6860 | -3.9186 | 0.0594 |
| Inf | 0.2284 | -5.4950 | 0.0316 |
| $Inf^2$ | -0.0033 | -5.0936 | 0.0364 |
| ln(ddbt) | 0.5610 | 2.2771 | 0.1505 |
| ln(topen) | -1.8208 | -4.1099 | 0.0544 |
| C | 5.3416 | 5.9312 | 0.0273 |
| R-squared = 0.9898; Adjusted R-squared = 0.8473; Mean dependent var = 2.3559; S.D. Dependent var = 0.3377; S.E. of regression= 0.1320; Long-run variance = 0.003781 | | | |

The estimated DOLS model shows that the long-run effect of foreign direct investment on domestic investment in Nigeria is positive, but not statistically significant. This could be attributed to several factors including inadequacy of inflow of FDI into key sectors of the economy. This finding corroborates that of Dantama and Usman (2012). However, the effect of interaction of FDI with financial intermediation (or financial system development) on domestic investment is positive and statistically significant at the 5% level. This underscores the relevance of well-developed financial system in enhancing the effect of FDI on domestic investment. The result indicates that development of the financial system would enhance the effect of FDI on domestic investment in Nigeria in the long-run.

The effect of interaction between FDI and secondary school enrolment (proxy for human capital) on domestic investment is negative and significant at the 6% level. A plausible explanation for this which is in sync with Kottaridi and Stengos (2007)

which found that FDI requires a threshold level of absorptive capacity in terms of human capital in order to positively affect growth is that the level of human capital in the economy is less than the threshold required for FDI to positively affect domestic investment (which is a key determinant of growth) in the economy in the long-run.

Inflation and squared inflation variables are significant at the 5% level. The positive sign on the former and the negative sign on the latter indicate existence of an inverted U-shaped relationship (i.e. ∩-shaped relationship) between inflation and domestic investment. At lower rates (of inflation), inflation positively affects domestic investment, but at higher rates, the effect becomes adverse (negative).

The effect of government domestic debt on domestic investment in Nigeria is statistically not significant as indicated by the p-value of the domestic debt as percentage of GDP variable. This suggests that government debt exerts no significant effect on (or is not an important determinant of, or factor affecting) domestic investment in Nigeria.

Finally, trade openness is observed to impact negatively on domestic investment in the country. The impact is significant at the 6% level. This could be attributed to the low level of development of the country's industrial sector, which engenders high dependence of the country on imports, as well as the high preference of foreign goods over locally made goods. Trade openness exposes domestic firms to international competition, and being unprepared for this as a result of poor production conditions in the country which reduces their competitiveness, domestic firms tend to cut down on their investment in the country.

The coefficient of determination (R-squared) and its adjusted value indicate that the model has very high explanatory power. The long-run variance is also satisfactory.

### 5.4. Test for Model Stability

Model stability enhances the reliability of the model for policy. We test the stability of the model using the plots of cumulative sum of recursive residuals (CUSUM) and cumulative sum of squared recursive residuals (CUSUMSQ) prescribed by Brown, Durbin, and Evans (1975). The plots are presented in Figures 3A and 3B.

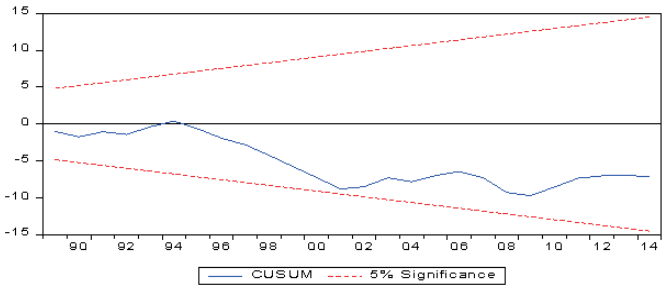


**Figure 3A. Plot of CUSUM**

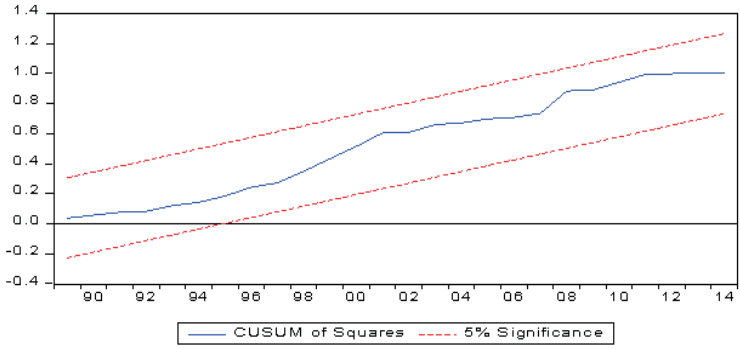


**Figure 3B. Plot of CUSUMSQ**

Both plots lie between the critical bounds at the 5% significance level. This indicates that the model is structurally stable and can therefore be relied upon for policy purposes.

## 6. Conclusion and Policy Recommendations

The paper investigated the effect of FDI on domestic investment in Nigeria. The effects of interactions between FDI and financial system development and, FDI and secondary school enrolment (proxy for human capital) were also investigated. The empirical evidence from DOLS estimation technique indicates that the long-run effect of FDI on domestic investment is positive, but not statistically significant. The effect of interaction between FDI and financial system development was observed to be positive and statistically significant, indicating that the development of the financial system enhances the effect of FDI on domestic investment in the country. The study further finds that the interaction between FDI and secondary school enrolment is negatively related to domestic investment, indicating that the quality of secondary education in the country is generally low and hence human capital has not been able to absorb the benefits of FDI to translate it into positive effect on domestic investment.

Also indicated is evidence of threshold effect of inflation on domestic investment as low rates of inflation were observed to be favourable to domestic investment, whereas higher rates adversely affect it. The effect of federal government domestic debt on domestic investment is statistically not significant. Trade openness was observed to adversely affect domestic investment. This was attributed to the adverse effect of exposure of domestic firms (infant industry) to global competition.

Based on the empirical evidence, the following are recommended for policy consideration:

I. The development of the financial system should be prioritized by the regulators of the financial system. Financial system development would enhance the efficiency of system as well as enhance its absorptive capacity to engender significant positive effect of FDI on domestic investment.

II. The negative coefficient of the interaction between FDI and secondary school enrolment, which indicates that secondary education in the country has not been qualitative and functional, calls for efforts by the government (by way of increased funding and engagement of well-motivated teachers) to improve the quality of secondary education in the country.

III. There is need for the Central Bank of Nigeria to target and doggedly pursue achieving low inflation as this would enhance domestic investment in the country.

IV. Considering the trade openness adversely affects domestic investment in the country, protection of local (infant) industry (by way of higher tariffs on goods that can be efficiently produced locally, use of quotas, ban on importation of selected items, etc, so long as these do not generate retaliation), should be prioritized by the country's trade and investment policy makers. However, preconditions for infant and domestic industry protection in the country include reducing the cost of doing business, improving energy (power) supply, infrastructural development, man power development and so on. These would boost domestic output of goods and services and curtail higher inflation that would have resulted if these were not taken care of before imposition of restrictions on trade (especially importation).

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